book of less importance to the ornithologist—either professional or amateur for Mr. Stuart Baker has much new matter to record concerning many of the species passed under review, while the thirty coloured plates—reproduced from sketches by Messrs. Grönvold, Lodge, and Keulemans—have a distinct scientific value of their own, altogether apart from their beauty as works of art.

The origin of the book dates from 1896, when the author was asked to communicate a series of illustrated articles on Indian ducks to the Journal of the Bombay Natural History Society which should incorporate the numerous notes on the group published in the Indian scientific journals and sporting papers since the issue of Hume and Marshall's well-known "Game-birds of India." These articles were commenced in the eleventh volume of the aforesaid serial, and the work now before us is a reprint of the series, with such additions and emendations as were necessary to bring them up to date.

Apart from the flamingoes, which are brigaded with the ducks under the general title of "Chenomorphæ," the author recognises no fewer than forty-three representatives of the group as visiting or permanently residing in India. He is, however, somewhat of a "splitter," and certain of his species, as in the goose-section, would very probably be relegated to a lower grade by many naturalists. We are also inclined to disagree with his views as to the multiplication of generic groups. The division of the flamingoes into two genera, and likewise the splitting of the brent-geese into Rufibrenta and Branta, are examples of what appears to us totally unnecessary complication in this matter. The author has, however, taken Count Salvadore's British Museum catalogue of the group as his guide, and he has adhered religiously to the classification therein adopted. We confess to a feeling that it would have been better to follow the late Dr. Blanford's volume in the "Fauna of British India," whereby greater simplicity would have been secured, and at the same time some advance made towards uniformity in the names of Indian animals. In this connection we may note the urgent need of a proper table of contents at the commencement of the volume, the one which does duty therefor being too absurd for words, two out of its half-dozen items being "title-page" and "contents," while a third is "Indian Ducks."

For a book which must be largely patronised by sportsmen (if it is to make a profit), we also venture to think that too many technical terms, or definitions, are introduced without any sort of explanation. What, for instance, will the sportsman (or, for that matter, the amateur naturalist) make of the bald statement that the Chenomorphæ are characterised by having the "palate desmognathous," or what will he understand by the "neotropical region"? If such expressions are used at all, they ought to be adequately explained; but in our opinion they are altogether out of place in a work of this nature; the professional naturalist does not want them, and the amateur and the sportsman do not understand them. In the place of the former a statement to the effect that the palate in the dry skull is of the closed or bridged type, and that the difference between the bridged and the open or slit type may be realised by comparing the skull of a duck with that of a fowl, would have been much more to the point; while as regards the latter it would have been infinitely better to use the ordinary names, South and Central America, in place of neotropical region.

With these exceptions—if it be added that the author has an extremely old-fashioned and obsolete way of spelling Indian place-names—we have nothing but commendation for the volume before us, the species being clearly and carefully described, with full and well-written notices of their distribution and habits. As Mr. Baker observes, the collection and collation of a vast amount of scattered information concerning the Indian Anatidæ renders it from the first possible to know the extent of our information on the subject, and to realise what gaps require filling up. The book should be in the library of every Indian sportsman, by whom it should be taken into camp in each winter's sporting trip. R. L.

BIOCHEMICAL MONOGRAPHS.

The Nature of Enzyme Action. By Dr. W. M. Bayliss, F.R.S. Pp. ix+90. (London: Longmans, Green and Co., 1908.) Price 3*s.* net.

The Chemical Constitution of the Proteins. By Dr. R. H. Aders Plimmer. In two parts. Part i., pp. xii+100; part ii., pp. xi+66. (London: Longmans, Green and Co., 1908.) Part i., 3*s.* net; part ii., 2*s.* 6*d.* net.

Neuere Ergebnisse auf dem Gebiete der speziellen Eiweisschemie. By Emil Abderhalden. Pp. 128. (Jena: G. Fischer, 1909.) Price 3.50 marks.

Intracellular Enzymes. A Course of Lectures given in the Physiological Laboratory, University of London. By Dr. H. M. Vernon. Pp. xi+240. (London: John Murray, 1908.) Price 7*s.* 6*d.* net.

THE number of books issued in any particular subject is not always a sure criterion of the importance of that subject. In this particular instance, however, where a shower of five monographs has suddenly fallen, not only is the interest which biochemistry is at present attracting indicated, but a perusal of the books themselves shows that they deal with a subject of supreme importance both to the chemist and to the biologist.

The first three on the list, that by Dr. Bayliss, and the two parts from the pen of Dr. Plimmer, are monographs which are being issued under the joint editorship of Dr. F. G. Hopkins, of Cambridge, and Dr. R. H. Aders Plimmer, of University College, London. To some extent the idea is similar to that underlying the issue of the "Ergebnisse der Physiologie" in Germany, only with this important difference, namely, that the individual monographs or chapters (each written by someone who is master in that particular subject) are issued independently of the others, so that if necessity arises a new edition of any

one of them can be printed without re-issuing the whole series. The rate of progress now being made in biochemical science is so rapid that this method of publication is the best that can be adopted for keeping abreast of increasing knowledge; and, in addition to this, those interested in any particular subject will be able to obtain the latest information at minimal expense.

Dr. Bayliss's essay on enzyme action is a fitting introduction to the series, not only because of its excellence, but also because it is becoming recognised that the action of ferments lies at the root of biochemical actions. Outside the living organism the same chemical changes can be made to occur, but only, as a rule, at a high temperature or by the aid of powerful reagents. In the body, the changes are produced at body temperature with far greater rapidity, and in the presence of moderate concentrations of acid or alkali. The enzymes responsible for this action are catalysts; that is to say, their presence induces a rapidity in the chemical transformation of the substances they come in contact with, in a manner analogous to that seen in the action of inorganic catalysts. Any deviation from the laws of catalytic phenomena which they exhibit depends upon the colloidal nature of the enzymes. This statement gives in brief the gist of the book. Such questions as the reversibility of ferment action, the nature of the compound between enzyme and substrate, and autocatalysis both positive and negative are also discussed, the whole forming an up-to-date, clear and readable exposition of our knowledge on this most important subject, a subject which Dr. Bayliss's own original work has done so much to elucidate.

Dr. Plimmer's work is a brief and masterly exposition of the present state of protein chemistry, and is most appropriately dedicated to Prof. Emil Fischer, whose epoch-making discoveries have done so much to render clear what before was so obscure. In the first of the two parts, the protein molecule as a whole is first examined, and then the individual amino-acids which form its constituent units are treated, and finally, in the second part, the attempts made by Fischer and his colleagues to build albumin from its constituent bricks are described. It is in this last aspect that the subject is least complete, because, although Fischer has been successful in forming short linkages of amino-acids which he terms polypeptides, and although some of the longer chains he has constructed bear a close resemblance to the peptones, it is well known that his ultimate aim, the synthesis of albumin itself, has not yet been realised. One cannot, however, doubt that this culmination of his work is only a matter of time.

Prof. Abderhalden, in his monograph, traverses much the same ground. He has been Prof. Fischer's right-hand man throughout his arduous work, and so is well fitted to expound it. His pamphlet is a reprint of the chapter he has written on the subject in Karl Oppenheimer's "Handbuch der Biochemie," which is now issuing from the press.

It must not be supposed that either Dr. Plimmer's or Prof. Abderhalden's contributions to the subject cover the whole ground. In Oppenheimer's handbook there are several other chapters on the proteins which deal with them from other points of view. There is, for instance, their importance from the biological side, and the *rôle* they play in life and in the metabolism of living cells. But before it is possible to understand that to the full, the chemistry of the protein molecule must be understood first. That is the foundation upon which the biologist must build, and that is the reason why so many researchers are spending their lives on the purely chemical aspect of this most important question. Proteins are the most abundant of the constituents of protoplasm; they are always present and never absent, and so far no other laboratory has succeeded in constructing them but the laboratory of the living cell. Chemists and biologists alike, however, are beginning to doubt whether proteins are exclusively endowed with the properties we term vital, and are beginning to direct their attention to some other substances which are universally present in protoplasm, and which manifest the character of lability to an even greater degree than do some of the proteins. These substances are termed lipoids, and cholesterin and lecithin may be taken as examples of the class. As a rule they are present in much smaller quantity than are the proteins, but they appear to be an indispensable part of the living molecule.

In Dr. Vernon's little book we return once more to the question of enzymes. It is the seventh of a series of books which Mr. Murray is issuing under the auspices of the University of London; like the others, it is the outcome of a course of lecures delivered in the physiological laboratory of that institution, and it will compare very favourably with its predecessors.

As already stated, it is becoming more and more clearly recognised that the activities of living protoplasm are bound up with the activities of ferments, the complex organic keys which are able to lock and unlock the unions between the elaborate molecular groups of which living material consists. The action of extra-cellular enzymes, such as pepsin and trypsin, which do their work outside the body-cells, has been familiar for many years. So also is the enzymatic activity of such micro-organisms as yeast and bacteria. But the conception that metabolism in the higher organisms is mainly the result of ferment action in their cells is a comparatively new aspect of the subject, and consequently the one in which the gaps in our knowledge are the most numerous. Dr. Vernon himself, by his original work on autolysis, on tissue erepsin, and other ferments of similar nature, has done a good deal to bridge over these intervals, and is therefore well fitted to lecture upon and write about the subject in a systematic manner. The book that he has produced is eminently readable and highly instructive, and its perusal should be thoughtfully undertaken by all those interested in the mechanism of the many problems presented to the student of animal and vegetable life. W. D. H.